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Forestry Problems in the United States

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III

The Mississippi River and Forestry

THIS PAMPHLET FOR SALE BY
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Yale University

Forest School

New Haven, Connecticut

Nov. 11, 1905.

To whom it may concern:

This certifies that Mr. Thomas Parker Ivy attended the Yale Forest School during the year 1904 to 1905.

Mr. Ivy was faithful in his attendance and his work was satisfactory to the officers of the school.

H. S. GRAVES,

Director.

Biltmore Forest School

C. A. Schenck, Ph.D., Director

BILTMORE, N. C.

December 1, 1905

To whom it may concern:

Thomas P. Ivy has attended the Biltmore Forest School from January, 1904, to May, 1904.

Mr. Ivy has shown deep interest in the practical work as well as the theorectical lectures in forestry at Biltmore, and he left the school entirely from his own choice before completing the course.

Yours truly,

C. A. SCHENCK.

FORESTRY PROBLEMS IN THE UNITED STATES

BY

THOMAS P. IVY, B. A.

1906
HENDERSONVILLE, NORTH CAROLINA

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FOREWORD.

"Express yourself.
Whatever you are, out with it!
We do not want a world of masqueraders.
Make yourself felt, make your real self felt.
Put your private stamp upon the future."

THE writing of this pamphlet was undertaken to present in a short space and in uncensored language the forest situation as it appears to be to-day in the United States. It is the opinion of the writer that much of what the National Government is doing in the name of forestry is based on a mistaken forest policy, and if continued the nation as a whole will be in a worse forest condition an hundred years hence than if our present forest problems had been left to individuals and to the States to work out. If this contention is true, it is most important that the error be corrected now. Whether there are errors or not can only be ascertained by a free discussion of forestry in Congress, on the rostrum, and in the public prints. Certainly it is supreme folly to leave a subject so vital to every citizen, State, and Territory, to be dealt with by the exclusive judgment of one person, the United States Forester.

THOMAS P. IVY.

DUNLINNE, CENTRE CONWAY, N. H., March 1, 1906.

THE PUBLIC DOMAIN.

WHERE, WHEN AND HOW ACQUIRED.

1783—Treaty of Peace with Great Britain gave to United States all land she held in America by discovery or treaty with Holland, France and Spain.
Area: 259,171,787 acres.

1798—Concession from State of Georgia.

Area: 56,689,920 acres.
Cost: $6,200,000.
Cost per acre: 10 10-11 cents.

1803—Louisiana Purchase (France).

Area: 756,961,280 acres.
Cost: $27,269,621.98.
Cost per acre: 3⅗ cents.

1819—East and West Florida (Spain).

Area: 37,931,520 acres.
Cost: $6,489,768.
Cost per acre: 17 1-10 cents.

1845—Texas Purchase.

Area: 61,892,480 acres.
Cost: $16,000,000.
Cost per acre: 25 17-20 cents.

1848—Gaudaloupe-Hidalgo (Mexico).

Area: 334,443,520 acres.
Cost: $15,000,000.
Cost per acre: 4½ cents.

1853—Gadsden Purchase (Mexico).

Area: 29,142,400 acres.
Cost: $10,000,000.
Cost per acre: 34 3-10 cents.

1867—Alaska Purchase (Russia).

Area: 369,529,000 acres.
Cost: $7,200,000.
Cost per acre: 1 19-20 cents.

Total cession ..... 259,171,787 acres.
Total purchases ... 1,589,900,800 "

Grand total ... 1,849,072,587 "

Total cost of purchases...$81,957,389.98
Average cost per acre.... 5 1-10 cents

OUR INSULAR POSSESSIONS.

1898—Hawaiian Islands.

Area: 4,313,600 acres.
Cost: Annexed.

1899—Porto Rico, Philippine Islands: (Spain) Treaty of Paris.

Area: Porto Rico, 2,295,280 acres. Philippine Islands, 73,616,640 acres.
Cost: $20,000,000 for the Philippine Islands. Porto Rico ceded.

The Public Domain in the Philippines is estimated at 61,000,000 acres. Of this 40,000,000 acres are forest lands.

THE FOREST SERVICE AND THE CIVIL SERVICE.

Forestry, in general, may be fairly defined as the treatment of land and tree growth for the maintenance or creation of woodland to be utilized for forest products, or for a protective covering, or for pleasure, or for all of these purposes. But the growing and harvesting of timber and wood for man's use must always remain the central idea and leading purpose of forestry. The utility of the forest floor for conserving the rainfall and the retention of trees for landscape effects are the incidental, not the essential, features of forestry, although under the first of these heads conditions might exist that demanded a forest for the influence solely in regulating the rate of the run-off of the rainfall.

The earliest adoption of forestry principles in this country was at Exeter in New Hampshire, in 1640, when regulations for the cutting of oak were promulgated. From that date down to our own time very little was done because our forests were so abundant that provision for the future seemed unnecessary. After the Republic was established, the rapid settlement of the country, the extensive railroad and mineral development, the requirements of pulp for the press and the demands of almost every line of manufacture made such inroads upon the visible supply as to cause some uneasiness about future supplies. In response to this feeling the Congress appropriated, in 1876, $2,000 for a forestal agency in the Department of Agriculture. From that date to 1898 there were, in order, three chiefs—Drs. Hough, Eggleston and Fernow—of the Division of Forestry. These men had many difficulties to encounter—most of all, a lukewarm public sentiment manifest in the small annual appropriation by the Congress for prosecuting their inquiries. But these men, for their earnest efforts in the infancy of forestry in the United States, should not be deprived of their meed of praise. The works of Dr. Hough will always be a valuable source of reference, and Dr. B. E. Fernow we still have with us as our most learned book forester.

In 1898 the present United States Forester, Mr. Gifford Pinchot, came into power. With his advent the appropriation has been in-

creased greatly—from $2,000 in 1876 to $900,000 last year, 1905. The scope of forestry work and investigation has also been enlarged and the division raised to a Bureau in the Department of Agriculture. Whether all that Mr. Pinchot has done and is doing is forestry, or merely carrying out his personal wishes and ambition, intelligent criticism and judgment must decide. Besides being the United States Forester, Mr. Pinchot is one of the founders and the promoter of the Yale Forest School. Out of his school about 80 per cent. of the foresters that now yearly get places are taken. The remaining 20 per cent. come from the other half-dozen forestry schools, or schools that teach forestry, in the rest of the United States.

As has been stated, governmental forestry started as an agency in the Department of Agriculture in 1876. The agency was promoted successively to a division (1881) and a Bureau (1901). In 1905 there was a change in nomenclature, and what had been known as the Bureau of Forestry became the Forest Service. The term "Forest Service" includes the organization, the work, and the men and officers who do the work of the government, in looking after the National Reserves, and such other operations of a forestry nature as the United States Forester decides to engage in.

The varied work of the Forest Service is organized under seven offices, viz.: Office of Forester; Office of Measurements; Office of Management; Office of Extension; Office of Dendrology; Office of Products; Office of Records. These seven offices are again subdivided into sections. Nominally, the Secretary of Agriculture is at the head of the Forest Service. But it is well known that, practically, the Secretary of Agriculture is so busy on his farms he neglects his forests altogether. The real head is the United States Forester, to whom everybody is responsible, and he is responsible to nobody. In his absence the Associate Forester, the chief executive officer, acts. The Fiscal Agent comes next after the Associate Forester.

The number of officers and men engaged in the several grades of the Forest Service are as follows: 1 Forester, 1 Associate Forester, 5 Assistant Foresters, 10 Forest Inspectors, 6 Assistant Forest Inspectors, 102 Forest Assistants, 13 Forest Agents, 14 Experts, 9 Engineers of Tests, 2 Civil Engineers, 79 officers in charge of Reserves, 390 Forest Rangers—a total of 532. How inadequate this

number is, compared to what the force should be if the forests of the United States were properly cared for, can be shown by referring to European states. France has a forest force, all told, of nearly 4,000, and Great Britain, to manage and protect the forests of India, employs 10,000 in the ranks from guards to conservators. The salaries of field men in our Forest Service range from $700 to $3,500. Rangers receive from $700 to $800; Forest Assistants, from $900 to $1,400; Supervisors, from $1,000 to $2,000. If the service is to have good men and retain them, these salaries will have to be increased. No class of men belonging to the government service deserves good pay so much as the Forester. His life is one exposed to many risks and hazards and his whole time is devoted to his profession, usually away from and out of touch with civilization, without the usual opportunities of other men for the investment of his savings, if he is fortunate enough to have any.

Positions in the Forest Service are supposed to be reached through examination under the Civil Service laws. The Act of Congress of February 1, 1905, transferred the Reserves from the Department of the Interior to the Department of Agriculture. But before the transfer bill could be passed, all of the existing officers and employees on the Reserves were classified and placed under the Civil Service rules. Furthermore, section 3 of the Transfer Act provided that all supervisors and rangers needed in the future for the Reserves should be selected, when practicable, "from qualified citizens of the States or Territories in which said Reserves, respectively, are situated." This was a wise provision, and if carried out will have a salutary influence. It was intended to protect citizens of a State in their rights which residence in the State or Territory conferred. Besides, it would tend to bring the Forest Service in direct touch with the people. But if the present United States Forester exercises the same arbitrary methods with Rangers and Supervisors that he does in other branches of the service, section 3 may as well have been omitted. Apparently no law or statute can stand in the way of his personal wishes and prejudices.

The examination for Rangers and Supervisors hinges more on physical and moral qualities than mental attainments. It is different with the Forest Assistant. He requires technical qualifications of a

high order and has to pass an examination in scientific forestry, dendrology and lumbering, for which a course of two years at a forest school, provided he is already a college graduate, is usually taken to prepare himself thoroughly. Examinations for Forest Assistants are held usually at several places. They are held under the auspices of the Civil Service Commission, and the names of those who pass—that is, those who receive the required government percentage of 70—are placed by the Civil Service Commission on the register in the order of their rating. Now, that is all the part the Civil Service Commission takes, in or after the examination. The United States Forester does all the rest. He makes up the questions for the examination papers and he appoints the men to rate the papers. When he wishes a Forester and goes to the Civil Service Commissioner for a name, if he does not like the man whose name is offered to him he can reject it. After a Forester has been on the register of the Civil Service Commission for a year he is disqualified and all of his work counts for nothing so far as the government employment is concerned. Such are the rules and regulations, called Civil Service, that have been established at the instance of the present United States Forester, that he may exert his benign influence to keep all out of the Forest Service who do not come within the favored circle.

In a letter addressed to the Civil Service Commission in December last, the writer went over this whole ground. A portion of that letter is reproduced here:

"Let us begin with the examination, where the Commission and the candidate first touch elbows. The sheets on which answers are to be written should have nothing on the top margin except (1) the subject of examination, (2) the date, (3) the candidate's examination number. The candidate's name and residence, the name of the place where the examination is held, should all be written in the beginning of the examination on a separate slip bearing the candidate's examination number. This slip should be used only to identify the candidate after his papers are rated. If such sheets as these were delivered to the parties authorized to rate them, there would be on them the least possible evidence by which the identity of the candidate might be revealed to the examiner. Leaving off the name of the place where the examination is held would also tend to disguise the

forest school of the candidate and to that extent put all the forest schools on the same basis. The examination over, the next move is to have the papers rated. Who should do this? Your custom is to assign the work to officials of the Forest Service, giving the papers on Technical Forestry that count 50 per cent. out of the possible 100 per cent. to the Associate Forester. This is one of the worst features. These forest officials are administrative officers whose duties lie afield with the men after they have been taken into the Service. These duties should occupy all their thought and time, and they are such duties as do not induce that condition of mentality which can weigh and balance the fine differences required to be adjusted in rating these papers. That is strictly a professional and judicial function.

"A second objection: The Associate Forester has had more or less correspondence with every candidate the preceding one or two years, and therefore the sheets, though carefully guarded, as suggested, do not disguise the identity of the candidate from him.

"A third objection: Making an administrative official and an examining official one and the same is confounding officers that ought to be kept separate. No man can properly serve two conflicting interests at the same time. The revelations of recent insurance investigations bear directly on this point. Other departments of the government take cognizance of this. For admission both to the Army and Navy we find that the cadets are not examined by their commanders in the field. This practice must be a good one, or it would not have been continued for a century. Therefore, I say have the papers rated by an impartial board, wholly distinct from the administrative forest officials.

"The examination and rating over, the candidates who have received the necessary percentage to pass are entered on the Eligible Register in the order of the percentages obtained in the examination. A vacancy occurs in the Forest Service. How do you fill it? Three names, you say, beginning with the highest percentage man on the register, are taken in order. From these three the United States Forester, or, in his stead, the Assistant Forester, has to take one to fill the vacancy, and may reject any two of them. The two rejected ones go back on the register in their respective order and wait for another vacancy and chance. In this way either or both of them may be rejected to the end of the year, when their eligibility expires. Why

give this right of choice? It certainly deprives the highest percentage man of the value of his scholarship, for he is placed on the same basis with the man of lowest rating. How you can compute fairness and justice in the procedure I am at a loss to understand. Why should the United States Forester be given any choice at all? It is just at this juncture you permit 'personalism' to come into the Forest Service. 'Can't we trust the United States Forester to do the square thing?' you ask. No human being can be entrusted with unchecked arbitrary power. When we bridge a stream we do not make the plans for the low-water mark, but for the high-water mark. We want a structure that will afford transportation at any season of the year and under all conditions of the weather. When you bestow upon the United States Forester the right of choice and rejection, you are surely making your bridge plans from the low-water mark. Your procedure, relative to the man on the register, is a lottery, a gamble, in which the United States Forester is both stake-holder and judge. And I undertake to say, without fear of successful contradiction, that no man on the Eligible Register, no matter how high his percentage or how valuable his services might be to the country, can enter the Forest Service unless he is in personal favor with the United States Forester; that any man, however worthless in character and of mediocre intellect and technical acquirements, can enter the Forest Service if he is in personal favor with the United States Forester. That is to say, your present methods and procedure make both these contingencies possible.

"Now, why not do away with all this lottery and gamble? Ought it to be true that a young Forester who has spent two years of his life and $2,000 of his money to pass the examination, when he has passed, holds nothing but a ticket in a lottery where the drawing is manipulated by a device which does not permit even the fairness of luck? Why not adopt the straightforward methods of the German Forest Service? There the candidate who passes the examination is placed on the Eligible Register in the order of his rating. When a vacancy occurs priority rules and eligibility is continuous, so that every man on the eligible list is sure of an appointment if he is willing to wait for the vacancy."

To this letter the Civil Service Commission, with their usual courtesy, replied in part as follows:

"The Commission desires to thank you for the very excellent suggestion made in your letter concerning the methods which are desirable in conducting examinations and in making certification. The provisions of the Civil Service law and rules, however, render it impossible for this office to secure assistance in rating papers of persons who are not connected with the Government Service, and the Commission is unaware of any competent person in the Government Service along forestry lines except those in the Department of Agriculture. Under these conditions, it is obliged to depart somewhat from the ideal system which would entirely separate the nominating and appointing power from that engaged in rating the papers of competitors. Under these rules, the Commission is required to certify the names of the highest three eligibles, if there be that many, in order that the appointing officer may exercise a proper discretion in selection for the service."

If the rules are not fair, as the Commission practically concedes, why are they not changed? Without doubt, because the United States Forester does not want them changed. As they are, he is judge and editor, prosecuting attorney and jury, all combined in one. In no other department of the Government can there be found such absolute and comprehensive power placed in one individual's possession. The whole Forest Service lies helpless at his feet, to be made use of to carry out his personal ends and ambitions, which may or may not be the forest interests of the country.

The same dictatorship is also over those who wish to come into the Forest Service. For them he sets the trap, he prepares the bait, and he catches only game pleasing to his palate. Under such methods the Forest Service can never be representative of the American people. It will become only a type—a type that must consider the United States Forester greater than the United States people.

But what we want is a Forest Service made up of all classes of the people. There should be no distinction, no difference in treatment of Jew or Gentile, of Catholic or Protestant, for of all these is the American Nation. This has been the policy in the Army and Navy, and so far, when the country has needed our Army and Navy, both arms of the military service have been equal to the demands made upon them.

LOCATION AND AREA OF THE NATIONAL FOREST RESERVES IN THE UNITED STATES, ALASKA, AND PORTO RICO, JAN. 25, 1906.

[From "The Forest Service."]

State.	Reserve.	Area.	Totals.
		Acres.	
Arizona	Black Mesa	1,658,880	
do	Prescott	423,680	
do	Grand Canyon	2,307,520	
do	San Francisco Mountains	1,975,310	
do	Santa Rita	387,300	
do	Santa Catalina	155,520	
do	Mount Graham	118,600	
do	Chiricahua	169,600	
do	Pinal Mountains	45,760	
do	Tonto	1,115,200	
			8,357,370
California	Tahoe[1]	838,837	
do	Stanislaus	627,780	
do	Sierra	5,040,520	
do	Santa Barbara	1,838,323	
do	San Bernardino	737,120	
do	San Gabriel	555,520	
do	San Jacinto	668,160	
do	Trabuco Canyon	109,920	
do	Warner Mountains	306,518	
do	Modoc	288,218	
do	Plumas	579,520	
do	Trinity	1,243,042	
do	Klamath	1,896,313	
do	Lassen Peak	897,115	
do	Diamond Mountain	626,724	
do	Shasta	1,377,126	
do	Yuba	524,287	
			18,155,043
Colorado	Battlement Mesa	797,720	
do	Pike's Peak	1,681,667	
do	White River	970,880	
do	San Isabel	321,227	
do	Gunnison	901,270	
do	Leadville	1,219,947	
do	Medicine Bow[2]	1,155,909	
do	San Juan	1,437,406	
do	Park Range	757,116	
do	Wet Mountains	239,621	
do	Cochetopah	1,133,330	
do	Montezuma	576,719	

Colorado	Uncompahgre	478,111	
do	Holy Cross	990,720	
do	La Sal[3]	29,502	
			12,691,145
Idaho	Bitter Root[4]	3,860,960	
do	Priest River[5]	541,160	
do	Pocatello	49,920	
do	Yellowstone[6]	177,960	
do	Sawtooth	1,947,520	
do	Weiser	324,964	
do	Henry's Lake	798,720	
do	Payette	1,460,960	
do	Cassia	326,160	
			9,488,324
Kansas	Garden City	97,280	
			97,280
Montana	Yellowstone[6]	1,229,680	
do	Bitter Root[4]	691,920	
do	Gallatin	40,320	
do	Lewis and Clark	4,670,720	
do	Madison	958,800	
do	Little Belt	583,560	
do	Highwood Mountains	45,080	
do	Elkhorn	186,240	
do	Hell Gate	1,481,280	
do	Big Belt	630,260	
			10,517,860
Nebraska	Niobrara	123,779	
do	Dismal River	85,123	
			208,902
Nevada	Tahoe[1]	59,115	
			59,115
New Mexico	Gila	2,823,900	
do	Pecos River	430,880	
do	Lincoln	542,519	
do	Portales	172,680	
do	Jemez	1,237,205	
			5,207,184
Oklahoma Ter.	Wichita	57,120	
			57,120
Oregon	Bull Run	142,080	
do	Cascade Range	4,424,440	
do	Ashland	18,560	
do	Baker City	52,480	
do	Wallowa	747,200	
do	Wenaha[7]	413,250	
do	Chesnimnus	220,320	
do	Maury Mountain	54,220	
			6,072,550

South Dakota	Black Hills[8]	1,163,320	
do	Cave Hills	23,360	
do	Slim Buttes	58,160	
do	Short Pine	19,040	
			1,263,880
Utah	Fish Lake	288,800	
do	Uinta[9]	2,218,216	
do	Payson	167,280	
do	Logan	182,080	
do	Manti	777,920	
do	Aquarius	639,000	
do	Grantsville	68,960	
do	Salt Lake	95,440	
do	Sevier	710,920	
do	Dixie	465,920	
do	Beaver	261,593	
do	La Sal[3]	128,960	
			6,005,089
Washington	Priest River[5]	103,960	
do	Mount Ranier	1,943,520	
do	Olympic	1,466,880	
do	Washington	3,952,840	
do	Wenaha[7]	318,400	
			7,785,600
Wyoming	Yellowstone[6]	6,580,920	
do	Black Hills[8]	46,440	
do	Big Horn	1,151,680	
do	Medicine Bow[2]	418,759	
do	Uinta[9]	63,662	
			8,261,431
Total of 95 Forest Reserves in the United States			94,227,893
Alaska	Afognak	403,640	
do	Alexander Archipelago	4,506,240	
			4,909,880
Porto Rico	Luquillo	65,950	
			65,950
Grand total of 98 Forest Reserves			99,203,723

[1]Total of Tahoe in California and Nevada: 897,952 acres.
[2]Total of Medicine Bow in Colorado and Wyoming: 1,574,668 acres.
[3]Total of La Sal in Colorado and Utah: 158,462 acres.
[4]Total of Bitter Root in Idaho and Montana: 4,552,880 acres.
[5]Total of Priest River in Idaho and Washington: 645,120 acres.
[6]Total of Yellowstone in Wyoming, Montana and Idaho: 7,988,560 acres.
[7]Total of Wenaha in Oregon and Washington: 731,650 acres.
[8]Total of Black Hills in South Dakota and Wyoming: 1,209,760 acres.
[9]Total of Uinta in Utah and Wyoming: 2,281,848 acres.

II.

THE RESERVE ACT OF 1891 AND THE EFFECT ON THE FORESTS OF THE EAST.

As an introduction to this branch of the subject, so much of the letter addressed to President Roosevelt by the writer as is pertinent is here inserted:

"During the past year it was my privilege to take into view the history of forestry in all European States and India. From a study of what has been done there, it became evident to me that successful forestry depends upon these two precedent conditions:

"(*a*) Correct Forest Policy.

"(*b*) Correct Forest Administration.

"If the policy is wrong and the administration is faulty, the results are bound to be disappointing. A forest policy, to be correct, should embody these two principles:

"(1) It must be gauged to the kind of government.

"(2) It must accord with the temper and occupations of the people. A forest administration will be a failure that is not both (1) efficient and (2) comprehensive. It must do all it does well, and know all that needs to be done.

"The National Forest Policy of the United States comes conveniently and is fairly well divided into three periods:

"(1) 1799-1870.

"(2) 1870-1891.

"(3) 1891-1906.

"The first period shows merely that the National Government even that early recognized its authority in forest protection. The second period marks the beginning of public discussion of forestry topics emphasized in the Timber Culture Act (1873) and by the appropriation in 1876 of $2,000 for a forestal agency in the Department of Agriculture. The third period was ushered in by the Reserve Act of 1891, giving the President authority to reserve from sale certain kinds of public lands, to be retained as Federal domain for forestry purposes.

"All of the national attempts at any kind of forestry previously to 1891 were failures, because the cardinal principles of correct forestry policy and administration were wanting. To this is to be added also

the further fact that during the early periods necessity had not developed a sentiment and action strong enough to carry these initial movements forward. This brings us to the consideration of the period of 1891-1906, in which we now are, and the important question is: Are we repeating previous errors or following sound principles under safe leaders?

"From those who hold the Reserve Act of 1891 as a great stride forward in forestry I am compelled to differ. The doubling of the price of lumber in the past decade, the slaughter going on in the East of all young prospective timber trees, the upsetting of our national forestry policy, the narrow and one-sided view of our forest administration—all these are, I charge, the natural fruits of the Reserve Act of 1891. If the Executive discretion permitted by the Act of 1891 had been exercised with moderation, possibly the criticism I am now making would have not applied. From a true forestry standpoint there was no necessity of taking but three classes of land, namely, (1) mountain slopes so steep that reforestration is practically impossible artificially, as nature has perhaps been thousands of years in clothing them with a forest which ought never to be cut away under any circumstances; (2) lands around bodies of water or other natural wonders that make the æsthetic values exceed the commercial; (3) lands with the finest specimens of Western forest species from which to gather seed for reforestration. If the selection had been held down within these limits it would have made no appreciable effect in the working of our land laws as they had been going on for a hundred years. On these lands thus reserved no cow, sheep, horse or goat should have been admitted for grazing purposes; all hunting should have been forbidden, thus creating an asylum for the preservation of our wild animal and bird life. If this had been the case we should not see now foresters practically converted into cow-boys.

"What is forestry, anyway? Some one high in authority has defined forestry in the United States as "conservative lumbering." Applied to the Pacific Coast only, the definition would be correct. Forestry in its truest and final analysis is the planting of a seedling in the place of every grown tree or other size felled for man's use, to be tended and protected until it in turn falls to a successor seedling. In the East, from the Mississippi to the Atlantic Ocean, forestry is sylviculture, pure and simple. In this Eastern area just defined, so far as I know,

our active forest administration is not spending one dollar. The whole appropriation of $900,000 passed by the last Congress is consumed in the live-stock and cow-boy operations in the far West, beyond the Mississippi River. Now here in the East we scarcely have enough timber left for breakfast. If the present forest policy is to be continued, will some one authorized to speak tell us how and where we are to get dinner and supper? It will require three good meals a day to keep us alive and agoing. Since the time of the growth of a seedling into a timber tree covers a span of seventy-five years, even beginning now, it will be rather a long wait between meals.

"I have referred to the price of lumber doubling in the last decade. Some one says that it is due to increased demand. Partly that is true. But lessening the supply has the same effect on the price of a commodity as increasing the demand. The sudden withdrawal of 94,000,000 acres of land from the right of entry was a very sensitive lessening of the supply. The intention to proclaim still other Reserves is a perceptible factor of short supply also. Every owner of stumpage in the United States has recognized this, and the better the timber the firmer it is held standing.

"The Reserve Act of 1891, then, has created an hiatus in our national lumber development and progress. Previously to that, our wooden industries, as local supplies were exhausted, removed to new supplies, this action resulting in periodical industrial migrations westward. But the giving out of a timber-land supply in the West has kept these industries at home, and in order to live they have entirely changed their methods in order that they might utilize the second growth of the forest here in the East. Results published in the last census are very convincing on this point. Out of the total number of minor wood-manufacturing plants, it was found that one-fourth of these were established in the census year 1899, thus indicating a rapid change in business to meet new conditions. Of all these new industries, sixty-two per cent. were private individuals, thirty-one per cent. were firms, and only seven per cent. were corporations. The result of this new class of operators shows itself very plainly in the woods. All the growing young timber is being cut before the manhood stage is reached, and even every trout brook is being stripped of its cover in the keen search for stock.

"So, figuring it as best we can, the East is facing a span of years without a home supply of timber, apparently ignored by our forest policy. But our National Government has plenty of money to experiment on alkali deserts and dry limestone mountainsides of the far West. Experiments are justified only in search of something needed and not in visible existence. All the Appalachian Range, the Piedmont Plateau, the Coastal Plain, the southwestern Mississippi Valley are the finest forest lands in the world. To neglect these certainties for experiments seems as unwise as starting a cotton plantation in the Adirondacks when thousands of acres of known cotton lands could be secured in the Southern States. It is almost a maxim that old countries offer legitimate fields for forestry, and that new countries, like the far West, are for exploitation.

"There is a political and economic dogma abroad in the land that governmental ownership and operation should take the place of private, because the people could get supplied cheaper. The present forest policy reverses this. It is that the government should sell its timber in such a way as to make lumber higher.* But higher lumber, when properly translated, means fewer homes. The safety and prosperity of the Republic, it has been well said, can be measured by the proportion of home-owners to the whole population.

"Destructive criticism is always easiest. To build up is more difficult. First of all, then, do away with the live-stock and cow-boy part of the Western undertakings and leave that business to individual American enterprise. Reduce the forces and curtail the expenses out there. Transfer the surplus foresters and funds to the East. Every State in the East needs a United States Forester of high order attached to its administrative staff. Let it be the duty of this Forester to do everything that ought to be done to start his State in a sane forest policy. In our State governments, with their comparatively feeble executive and administrative initiative, working alone in this way will take any given State twenty-five years to establish a correct forest policy and administration. For example, take New Hampshire, with which I am familiar. That State, since 1893, or in thir-

* "Study the change of prices in wood; they are sure signs of the conditions of supply and demand. It is perhaps not possible to draw valid conclusions from one statistical item; but if we find that the price of white pine uppers during the thirty years from 1870 to 1900 advanced 50 per cent., and in the three years following advanced 56 per cent., we do not need fine discrimination in order to realize that the end of this class of supply is near. Similarly, *all other woods have during the last fifteen years appreciated between 50 and 100 per cent.*"—Dr. B. E. Fernow.

teen years, has spent $18,000 in attempts at forestry, and out of that expenditure the State has not an acre of land or a single seedling planted to show for it. With a Forester there to advise and direct, this could not have happened. Any Forester who failed to bring his State into action would need rotation, to say the least. It is scarcely possible that a single State would refuse a United States Forester offered free of charge. This would be coöperative work that is needed in every State pressingly, without delay, for forestry methods can only succeed in this country when the local people are led on to approval. Down South, where I was born and grew up, we were accustomed to bull-whip our slaves into doing what we wanted, whether they liked it or not. That régime has passed away, never to be revived. The American people will not be bull-whipped into a kind of forestry they don't want.

"Sooner or later we shall have to remodel from top to bottom our forest administration, making it comprehensive enough for the great area and many different peoples that have to be dealt with. The forest problems of the United States are not a one-man proposition. They are beyond the ken of any one man to master and solve. Even in the smaller States of Europe the necessity of the division of responsibility in the forest administration is recognized. France, as many contend, has shown the greatest capacity in the managing of forestal property, and, financially speaking, France makes the best exhibit of a credit balance in forestry. From the experience of France and of Great Britain in India, probably we can learn most that we can utilize for administrative reform. Following somewhat after their model, we should have a board of at least seven forest conservators; six should come, one each, from the six forest zones into which the United States can be divided: (1) Pacific Coast, (2) Rocky Mountain States, (3) Lake States, (4) North Atlantic States, (5) South Atlantic and Gulf States, (6) Middle Western States. This division no one maintains is correct, botanically, but it is as nearly correct as our political units permit. The seventh conservator should be the Secretary of Agriculture *ex officio*, and he should be president of the board. This board should have a resident secretary in Washington and meet there as often as necessary—certainly twice a year—to authorize all moneys that are to be expended and to approve or disapprove all plans of the United States Forester. The members should

be appointed in pairs for two, four and six years, respectively, for their first terms, and after that for six years as each term expires. This would give an immortal body to keep alive a rational forest policy. Made up of such members from all sections of the country, this board would undoubtedly command the public confidence, and all of its decisions and acts would be accepted as final. If any one criticises this plan as too cumbersome and expensive, let it be compared with the same administration in India, which consists of nineteen conservators, one hundred and twenty-two deputy conservators, one hundred and seventy assistant conservators, with a field and protective force under them of ten thousand men.

"Further to popularize forestry in the United States, all appointments to the Forest Service should come from each of these six forest zones in proportion to the population of each zone. It goes without saying that a man born and reared in a particular section gets in closer touch with the *flora* and *fauna*, with the forest and its denizens, than some chance importation. But, most of all, he would understand the temper of the people—how to give them what they should receive and how to keep from them what they ought not to have without exciting opposition. With a forest administration and a forest service established on the basis of this outline, failure in forestry would belong only to the past history of the United States.

"With a board of administration such as this, it is not believed that the pressing forestry problems here in the East would lie untouched. As a specimen of one of these, look at what is taking place in the South Atlantic coastal plain. From Norfolk, Va., to southern Texas the long-leaf pine, associated with other species, forms what was once an unbroken belt of timber, extending at some points more than a hundred miles into the interior. It has been under the shelter of this belt of timber that truck farming over the entire area skirting the coast from Virginia to Texas has been carried on so successfully. Probably not less than a million people are engaged there in this industry and producing food products sufficient for five million people, chiefly in the great cities in the Northeast. The stimulus for high prices for lumber, largely induced by governmental action in the West, has made this belt in recent years the point of attack of the great lumber kings who captured and subdued the Lake States. This belt of timber is now being felled and sawed at the rate of

300,000,000 board feet per month, according to the returns of the Yellow Pine Association for 1905; that is to say, at the rate of 3,600,000,000 feet per annum, or, in the terms of tree units, 7,200,000 trees per annum. At this rate of consumption, within twenty-five years at the longest, this belt of timber will entirely disappear, for neither any State nor the nation is planting one seedling to take the place of the 7,200,000 trees that are felled annually. Now this belt of timber standing, as a physiographic feature, competes sharply with its commercial value sawn into lumber. It retains and dissipates backwards the heat of the warm winds from the Gulf, and, on the other hand, it parries the shock of the cold winds from the North, thus furnishing the ideal trucking region. In a few years these conditions will be changed, truck farming will be belated and hazardous from uncertain frost to bankruptcy. And yet our national forest policy can only find occupation in the far West!

"The very great importance of the subject, Mr. President, is the only excuse I have to offer in asking for enough of your valuable time to run over these suggestions; for it is known to you that the industry of wood products is the fourth* in the United States in annual value, amounting in the last census year to $1,031,000,000, and that of the total gross earnings ($1,900,000,000) of our railroads in 1904, 40 per cent. of this revenue was derived from transportation of forest products."

In treating of the topics touched upon in the letter with more detail, it will be well first to point out the differences between a park and a reserve. A park, as, for example, the Yellowstone Park, is established by a special act of Congress. A reserve is simply proclaimed by the President under authority of the Reserve Act of 1891, and can only be created out of the public lands which have not yet been taken up under any of the laws of entry still in force. Again,

*THE FOUR LEADING INDUSTRIES IN THE UNITED STATES.

	No. Establishments.	No. Laborers.	Wages.	Capital.	Product.
(1) Food products	61,300	314,000	$ 130,000,000	$ 941,000,000	$ 2,278,000,000
(2) Iron and steel	14,000	734,000	382,000,000	1,529,000,000	1,793,000,000
(3) Textile	30,000	1,030,000	342,000,000	1,367,000,000	1,637,000,000
(4) Lumber	47,000	547,000	212,000,000	946,000,000	1,031,000,000

a park may be created out of public lands, or private lands may be bought by the government for this purpose. A further distinction exists in the fact that reserves are set aside primarily for forestry purposes, whereas with a park that may be only one of the considerations leading to its establishment. The preservation of natural scenery of national importance may be the controlling influence for a park. What the people of the East are asking for, therefore, are parks—the White Mountain Park in New England and the Appalachian Park in the Southern States. They are wanted for forestry purposes, for natural scenery purposes, and, most of all, for the conservation and protection of water-sheds.

In regard to the Reserve Act itself, but little can be said in its favor, or of the methods by which it was passed. Only by courtesy can it be called an Act. It consists of a few lines engrafted on an appropriation bill in the expiring hours of Congress. Very few knew it was there, or what it really meant. That class of legislation has been very aptly styled "pickpocket" legislation, for something is done unawares. What has been attempted under the Reserve Act is, by far, the most considerable effort at forestry in the United States. As will be seen from the tabulation on another page, there are in the United States and Territories ninety-five reserves of a combined area of 94,227,893 acres. In Alaska there are two reserves of 4,909,880 acres, and in Porto Rico one reserve of 65,950 acres. How much of this area is woodland and forest and how much is grazing and agricultural land no one seems to know; for in the beginning of our reserve policy very little attention was paid to the kind of land taken, the object being to get about everything in sight. Upon investigation it will be seen that with the exception of four small reserves, one each in Oklahoma and Kansas, two in Nebraska, all the others are located in the Rocky Mountain States, on the Pacific slope or in the Territories of Arizona and New Mexico. At the time, and since, there has been much opposition in some of these States to the large amount of lands that have been reserved. This opposition is far more reasonable than the people of the East think. It has a basis both in law and justice. When these States were admitted into the Union it was supposed that the Federal domain within their limits would be subject to entry the same as had been the practice in predecessor States. All investments,

all individual and public improvements, were based on this assumption. To come after that and deprive those States, some of them of almost one-fourth their area, simply lessens the possibilities of State growth and individual wealth and prosperity to that extent. Whether the law, if tested in the Supreme Court, would be upheld, remains still unknown. Besides, what is there to prevent any succeeding President from restoring all these lands to entry lands again if he should be so inclined? As the increase of population in these States requires more land, will not that very demand be made upon the President? In view of such contingencies, is it a wise policy to expend all the forestry appropriation on these Reserves and leave the rest of the country uncared for?

But let us suppose the Reserves are maintained and increased, to what extent will they meet the requirement for timber and wood in the United States? Our Federal domain exclusive of Alaska amounted to 1,500,000,000 acres in round numbers. Of this amount the United States Government still owns 677,000,000 acres. This area may be subdivided into—

Grazing land	332,000,000 acres.
Woodland	184,000,000 acres.
Deserts	70,000,000 acres.
Indian	80,000,000 acres.
Miscellaneous	11,000,000 acres.

According to the latest bulletin of the Forest Service, already there have been set aside of the woodland for reserves 94,227,893 acres. When the whole 184,000,000 acres of woodland have been reserved, how far will that supply us in timber and wood? The lumber consumption of the United States is estimated at 45,000,000,000 feet b. m. annually. An acre of woodland will give an annual increment of 90 feet b. m. Therefore 184,000,000 acres would yield annually only 16,560,000,000 feet b. m., or a little more than one-third of the consumption to-day. But it is the future that we must provide for. An hundred years hence, when our population has doubled and trebled, our present national forest policy will scarcely yield firewood enough. Fortunately, however, all the woodland is not owned by the government. The total estimate of woodland in the United States is 700,000,000 acres. The government, as we have said, owns about 36 per cent. of the woodlands of the country, 30 per cent. are

attached to farms and the remaining 34 per cent. are controlled by lumbermen, railroads, and other corporations. But it is highly probable that not over half of this woodland is in a productive state. Much of it is in a stationary stage, where the death-rate equals the new growth, and much of it is cut-over land. So, actually, we are most likely now living off our principal instead of our interest and are daily approaching the end of that principal. What is to be done? Where is the remedy? The present United States Forester has defined forestry in the United States as "conservative lumbering," and since we must accept that as his prescription, let us see if we can find the merits of this cure-all. Conservative lumbering is opposed to destructive lumbering. It is lumbering with a due regard to the young growth and regeneration. It is also periodic lumbering: Cutting now the trees of a certain diameter and twenty years hence, or whatever period may be adopted, cutting the trees that have reached the original diameter, and repeating the operation *ad infinitum*. In the first place, it is lumbering, and lumbering presupposes the existence of a forest. If we had started out this way, or even fifty years ago made the beginning, the theory might have worked; that is, met the situation, if it is practical. It is too late now. Our existing forest area, if properly stocked and managed, would not yield a supply equal to the demand. In the second place, is the theory practical? It is a fine phrase; looks well on paper and sounds well when written. But take it into the woods, to a lumberman, and rattle it off. What will be the result? He will invite you to go away back and sit down on a log by the river and spend your time fishing. The lumberman, like everyone else engaged in a gainful occupation, wants the last dollar that he can get off the area *now*. He knows that financially forestry means the curtailment of present revenue for the sake of future revenue. The lumberman also knows that "conservative lumbering" is impractical in "soft" growth, in coniferous growth—pines, hemlock, cedar, firs, larch, and spruce. He knows that when a diameter-cutting is made in coniferous forest that in the next year or two the wind will cut the balance, because they are all flat-footed species, that is, have no tap-root, and can only withstand the wind so long as each one remains to help the other. Therefore the lumberman in coniferous growth makes a "clean cutting," converting the large diameter into lumber and selling the small diameter for pulp-wood to the paper mills.

So far we have investigated the merits of "conservative lumbering" in conifers. With the broad-leaved species the conditions are more favorable to conservative lumbering. The broad-leaved species are tap-rooted, and each individual can stand by himself, if necessary. "Conservative lumbering" is practical so far as the requirements of the broad-leaved forest are concerned, but the increased cost of that method of lumbering militates against its introduction. In addition to this objection the area of the broad-leaved forests is so small that "conservative lumbering" there would have little effect in keeping supply up to consumption—the goal that forestry must aim for and attain if it is to have public approval. This leads us to a view of the forest area in the United States. A few years back Dr. B. E. Fernow made this estimate of the standing timber in the United States:

Southern States	700,000,000,000 ft. b. m.
Northern States	500,000,000,000 ft. b. m.
Pacific Coast	1,000,000,000,000 ft. b. m.
Rocky Mountain States	100,000,000,000 ft. b. m.
Total	2,300,000,000,000 ft. b. m.

How much of this is broad-leaved and how much is coniferous timber we cannot determine accurately. We do know, however, that there are no broad-leaved forests in the Rocky Mountain States and on the Pacific Coast. What broad-leaved forests are here are the remnants of what were once the grandest hardwood forests of the world, in the Southern and the Northern States. The hardwood forests have had to resist the force of civilization and the force of vandal destruction besides. Occupying a deep rich soil, as compared to the thin soil of the coniferous, our hardwood species have been cut down and burned into ashes to increase the acreage of agriculture. In the last census year the lumber from conifers amounted to 26,150,000,000 feet b. m., and from hardwoods 8,630,000,000 feet b. m. Taking these figures as a guide, the hardwood area is scarcely one-third that of the conifers. This is misleading, for the largest area of conifers, the Pacific coast, yielded that year only 9.6 of the total cut. So we are safe in saying that the hardwood area in the United States, as compared to the coniferous, is about as 25 to 75. From the point of view of the writer, therefore, we have seen that "conservative lumbering" in coniferous forests is impractical because of natural obstacles, and in hardwood forests, which constitute anyway only 25 per cent. of the

forest area of the country, it will not be introduced on account of the increased cost of that method of lumbering. No one lumberman, looking out for financial gains, will add to his cost of production unless all his competitors do the same.

Before leaving this part of the subject, I wish to quote some statistics on supply and demand from Mr. R. A. Long, a very prominent lumberman of the West. His figures do not embrace the United States, as he has chosen those States and sections where the main supply of conifers stands. For the yellow-pine belt of the South and Southwest this is his estimate by States:

Florida	10,500,000,000 ft. b. m.
Mississippi	46,000,000,000 ft. b. m.
Alabama	11,250,000,000 ft. b. m.
Georgia	12,000,000,000 ft. b. m.
Arkansas	10,500,000,000 ft. b. m.
Missouri	2,000,000,000 ft. b. m.
Texas	30,000,000,000 ft. b. m.
Louisiana	45,000,000,000 ft. b. m.
North Carolina and Virginia	15,000,000,000 ft. b. m.
South Carolina	5,000,000,000 ft. b. m.
Total	187,250,000,000 ft. b. m.

The annual cut in this belt is now about 9,569,214,000 feet b. m., showing that the supply will be exhausted in less than twenty years.

For the white-pine belt of the Lake States the estimate is:

Wisconsin	13,000,000,000 ft. b. m.
Michigan	17,000,000,000 ft. b. m.
Minnesota	30,000,000,000 ft. b. m.
Total	60,000,000,000 ft. b. m.

At the rate of cut in 1890, namely, 5,419,333,000 feet b. m., the supply would be exhausted in eleven years.

On the Pacific Slope the estimate for Washington is 175,000,000,000 feet b. m., divided into species as follows:

Red Fir	90,593,000,000 ft. b. m.
Spruce	8,221,000,000 ft. b. m.
Cedar	22,646,000,000 ft. b. m.
Hemlock	41,571,000,000 ft. b. m.
Yellow Pine	13,082,000,000 ft. b. m.

Oregon has about 250,000,000,000 feet b. m., of which 170,000,000,000 feet are red fir and 50,000,000,000 feet yellow pine, the rest being divided into spruce, hemlock and cedar.

In California there are standing about 150,000,000,000 feet b. m. With the exception of a small amount of sugar pine, California's stock is about equally divided between redwood and yellow pine.

Adding together the amount standing in the three sections examined, we find the total stand of conifers is 842,000,000,000 feet b. m., and the total annual cut is 20,600,000,000. This would make the life of the supply, at the present rate of consumption, forty-one years. But when we take into the account that our population is increasing at the rate of 3 per cent. per annum—2,500,000 people—and that the increase in consumption per capita per annum is 10 per cent., the calculated life of forty-one years is quite too much.

If to the estimate above is added about 25,000,000,000 feet b. m. of white pine, spruce, and hemlock in New York, Pennsylvania, and the New England States, we should get still nearer to our total supply. Nor is there to the north of us, in the Dominion of Canada, so much forest wealth as one might think, as their total white pine standing is only about 37,000,000,000 feet b. m.

To meet the situation which these figures portend we have seen that the remedy of the present United States Forester is "conservative lumbering." As a part of this scheme the lumbermen of the United States are asked to found a chair of lumbering in one of the forest schools. That is to be a sort of Sunday-school where the lumbermen are to learn and teach the altruism of money-getting!

So far as the writer can judge, what is proposed by the United States Forester to solve the problem of keeping our forest supply adequate to the consumption would be just as effectual as a boy with a squirt-gun trying to save a great city in conflagration. Nor will the forest-fire laws, both for the protection of timber and seedlings—as much as that would help—do all that is needed.

What we shall have to come to and adopt is what other nations have found indispensable. We shall have to enact a national law of *Compulsory Reforestration*. This would bear equally on all owners of woodland, whether in large or small tracts. It would apply equally to all sections of the country and produce a uniform forest development; it would make State forestry possible and practicable—something that we shall have to do if a real forestry movement is to succeed.

Let us take as a working basis that the cost of reforestration per acre is $10. Whoever sells the wood or timber from his land, pro-

vided it is not to be converted into agricultural land, has only to add the $10 per acre for reforestration to the price. Who would do the reforestration? The State, and the National Government also. Such a general law by the government would lead all the States to enact similar laws, covering the points for each State that a national law could not reach. To reforest and care for the young growth would necessitate a forest administration in every State. By degrees, with such assistance as the National Government had to offer, a rational and safe State forest policy would in this way be worked out, and our forestry development would go along in harmony with our theory and system of government.

What the government is trying to do to-day does not fit in with our institutions and the customs of our people. We are a nation of individuals, and so long as we retain our individual initiative, so long shall we continue to be a great, free, and prosperous people. The selling of wood and timber is not one of our governmental functions. If we have undertaken it, we have followed to that extent bad advice. Elsewhere I have referred to the results of the present forest policy of the government. While saving one tree in the far West, we have by that action caused the destruction of two young trees in the East, whereas, if there had been no governmental interference with our law of development as it had been going on for a hundred years, the two young trees in the East would have been left to ripen, and the old tree of the far West would have been taken in its place. If this policy is continued, the East will find itself in less than twenty-five years dependent upon lumber for its homes to come from the far West. Is this a pleasant situation to contemplate, with a coal famine and railroad strike at the same time? What answer will our great captains of industry east of the Mississippi River make? Does a forest policy with such an outcome meet the wishes of the Illinois Central Railroad, the Louisville and Nashville, the Southern Pacific, the Southern, the Seaboard Air Line, the Pennsylvania, the New York Central, the Missouri and Texas Pacific, the New York, New Haven and Hartford, and the Boston and Maine? Will the Senators and Representatives in Congress east of the Mississippi and from Missouri southward continue to vote appropriations for a forest policy, the logic of which makes their constituents homeless and fireless? What say the people of the Middle West to buying their future supplies from a Pacific Coast lumber trust, promoted

by the misguided action of their own government? Heretofore the Middle West has been protected, in that it could draw on the Atlantic Seaboard, the Gulf Coast and the Mississippi River for lumber, and it is to their interest that all these sources should be kept open and alive.

As to a trust. When the government offers its timber on the reserves for sale by auction, who will be the buyers? No one can afford to, except the lumbermen of that section, and it is easy to see that they will control the government's output. Now, since the government began the reserve policy there has been a grab policy of the timber dealers all over the United States. The individual owner of timber-land is fast going, and in ten years he will have entirely disappeared. The timber of the United States will be held in a very few hands. It is for these few that the Reserve timber is unwittingly being held also, for they will take charge of every sale that is made.

To return to *Compulsory Reforestration.* Some say it cannot be done, on account of the Constitution. It would seem that the "welfare clause" in the Constitution ought to come in here. Then, too, we have a National Bank Act that applies all over the country, in each and every State. Why not a Forest Act? But can we not legislate for our own interests to the same extent that we have legislated for the Philippine Islands? In the "Forest Act" for the Philippines, reforestration is very clearly provided for.

It has been stated that forestry interests in the United States are too manifold and vast in extent to be entrusted to a single head; that it would be better if the policies of older countries were followed in dividing the responsibility and making a more comprehensive administration. How one man takes in the whole situation may be gathered from a review of the "Forester." This is the official annual publication of the United States Forester, and is supposed to tell what was done the past year. The "Forester" is continuous, that is, the pages are consecutively numbered from year to year. The "Forester" for 1905 fills in the pages from 199 to 237. The future historian of forestry for our period would turn first of all to the pages of the "Forester" for his information. That is the official organ, and should contain what was wanted. In the "Forester" of 1905 what do we find? First of all, the names of but two persons appear in or on its pages, one Secretary Wilson and the other the United States Forester. So far as this published record shows, these are the only two names connected with

forestry, and one of them, Secretary Wilson, is a well-known farmer. Elsewhere I have given the total number of the Forestry Service as 532. Have none of these men done anything of special excellence to win a place in the "Forester"? Ought not the public to know who are at the head of all the "offices" under which the Forest Service works? Why not print a roster of all the men in the higher grades of the service? Let the public know who they are and what they are doing. The demand to-day is for publicity, and nowhere is it needed more than in all departments at Washington.

Again, why not give us in detail the organization of at least one of the Reserves? How many men are required, their general grades and remuneration, and the total annual outlay on the Reserve? Beside this put the income from the Reserve. In that way the people who have to pay the bills could see for what they are paying. After reading through the "Forester" for 1905, I find these several general statements of the expenditure under the Forest Service:

Office of Dendrology	$ 15,086.44
Office of Measurements	30,158.99
Office of Extension	53,970.96
Office of Products	56,881.22
Office of Records	90,881.98
Office of Forester	121,078.16

Preceding each of these financial statements is a very general summary of the uses to which the moneys were applied. As far as I can make out, about two-thirds of the whole expenditure, that of Records and Forester, were devoted to the literary bureau, which apparently is always ready to attack anybody who is bold enough to criticise the United States Forester's acts and the public conduct of his office. But the statements are so mixed up it would be impossible from reading the "Forester" to say under which account a given expenditure falls.

There is no little said in the "Forester" about coöperative work with individuals, corporations and States. New Hampshire, for example, has coöperated with the Forest Service to the extent of $7,000. For this the State has received copies of a small volume, with maps on forest conditions in the northern part of the State, and a study of the growth of white pine and, perhaps, some other species are to be added. With this information in hand New Hampshire will lead all the States in forestry! Now, I am not criticising the scientific correctness of the work done or the men who did it; but I do say that it was

largely a case of *mis*-direction by an all-wise single head. What New Hampshire needed was a *demonstration of practical forestry principles.* These are (1) the gathering and saving of forest-tree seeds, (2) making seed-beds and care of nurseries, (3) reforestration of old fields and cut-over lands, (4) lumbering under the most difficult conditions, either in spruce and cypress swamps or on the steepest mountain slopes. If this kind of work had been carried on for a number of years, the people would have come to know what forestry is and the State would have had an asset for its $7,000. As it has been done, the State might just as well have voted to put $7,000 in gold in a bag and dropped it in the middle of Lake Winnipesaukee, and then looked for a grove of water-oaks to spring up, bearing a yearly crop of golden acorns. But why go to the trouble of criticism? *Nobody works but the United States Forester.*

FEDERAL FOREST LAWS AND OTHER LAWS THAT HAVE AFFECTED FORESTRY IN THE UNITED STATES.

1799.

Congress appropriated $200,000 for the purchase of naval timber lands on the islands off the coast of Georgia.

1817.

Congress authorized the President to reserve live-oak and cedar lands in the Louisiana Purchase.

1831.

Congress passes act to punish persons "cutting or destroying live-oak, red cedar or other trees growing over the United States."

1850.

The Swamp Land Law.

1867.

The Homestead Law.

1873.

The Timber Culture Act.

1877.

The Desert Land Act.

1878.

The Timber and Stone Act.

1891.

The Forest Reserve Act.

1902.

The Irrigation Law.

1905.

The Transfer Act.

THE MISSISSIPPI RIVER AND FORESTRY.

One of the common beliefs about forests is that they cause rain and make rivers. The opposite is true. Forests are the result of rain, rivers and other bodies of water. But without wind the influence of waters would be lessened greatly in the spread of forests. The magnificent forests that once stood on so much of our land were due, in the first instance, to our continental construction and location. On either side is a great ocean and to the south the Gulf of Mexico; stretching across the northern interior is a chain of lakes equal to an inland sea; upon either coast north and south runs a chain of mountains, the Appalachians on the Atlantic side and the Coast Range, the Sierras, Cascades and Rocky Mountains on the Pacific side. Now comes the wind into play. Laden with moisture from the oceans the wind starts up the mountains and ascends till a cooler stratum of atmosphere is reached, when condensation takes place and the rain falls, giving to the soil the required moisture for forest generation and growth. Precipitation, therefore, is due rather to elevation and not to forests. But to the winds we must give credit for the extent of our forests and perhaps, also, for their diversity; because here in a windy country we have about five hundred species against thirty or less in Europe of the same latitude.

The rivers in the United States may be classed geologically into two groups—Topography Rivers and Glacier Rivers. This classification is made with the reservation that all rivers were originally the result of topography. But the influence of the Glaciers in that recent geological period when all the northern part of North America was covered with an ice-sheet of mountain-thickness, was doubtless so great as literally to wipe out numerous rivers and so to change and divert the courses of others that the direction given to them by topography in the beginning cannot now be identified very accurately. As the southward movement of the Glaciers is defined, generally speaking, by the Ohio River, this places the Mississippi alone of the rivers flowing into the Gulf of Mexico and Atlantic in both of the groups. To the student in search of its life-history, the central trunk of the Mississippi, which rises in Lake Itasca, is of less interest than the main branch source, the yet undiscovered head-waters of the Missouri. *"The waters forming the Missouri are supplied in part by the hot

*Prof. I. C. Russell, in *Rivers of North America.*

springs and wonderful geysers of the Yellowstone Park, and in part by snow-banks and small glaciers in the more elevated valleys, and amphitheatre of the Rocky Mountains, in Idaho and Montana. To a small extent the waters of the great river come from Canadian territory. The countless lakes of Minnesota and Wisconsin extend like leaves on the terminal twigs of the central trunk. The head-waters of the Ohio, the largest branch of the Mississippi which joins it from the east, rise on the western slope of the Appalachian uplift in West Virginia and Pennsylvania. A small portion of south-western New York is also included in the Ohio drainage basin. The distance in a straight line from the head-waters of the Ohio northwestward to the source of the Missouri is over 1,800 miles. From the mouth of the Mississippi along its general course to the continental divide, which limits the drainage on the northwest, is about 2,500 miles, but including all the windings of the river, the actual distance that the water falling on the mountains of Montana has to travel in order to reach the sea is more than 4,000 miles. The entire area drained by the "Father of Waters" is about 1,240,000 square miles, or nearly one-third of the United States, exclusive of Alaska."

A river may be called a body of water in unstable equilibrium because its descent is down an inclined plane. In other words, a river is a natural canal of a tortuous course and varying gradient through which is offered a passageway to its outlet in lake, gulf, sea or ocean, for all the water that falls within its drainage basin. If water alone, however, were carried there would be scant reason for this discussion. During certain stages of its existence, a river transports in suspension and rolls along on its bottom vast quantities of material that are brought into its channel in obedience to the laws of mechanical and chemical degradation of the earth's surface. Thanks to the studies and experiments made by the War Department, our information on these points about the Mississippi is very full. According to the figures and measurements of the government experts, the Mississippi transports annually silt in suspension that "would occupy 6,718,694,400 cubic feet, or sufficient to cover one square mile to the depth of 241 feet." The amount of sand and gravel rolled along the bottom at the same time is estimated to be 750,000,000 cubic feet, thus reaching the total annual burden of "7,468,694,400 cubic feet, or sufficient to cover one square mile to

a depth of 268 feet." All of this burden is to be classed under the general head of mechanical degradation. In addition to this, it has been found that the Mississippi carries yearly in solution mineral matter to the amount of 112,832,171 tons. This belongs under the head of chemical degradation. Now, these computations and deductions are of very great value to us in two directions: In the first place, the *presence of vegetation* on a given area of the earth's surface *accelerates* chemical corrasion there. The rain-waters that fall upon a surface of vegetation and percolate into the earth get therefrom organic acids, principally humus acids, which greatly increase their solvent power and enable them to take with them subterranean minerals in solution into the receiving river. On the other hand, the *presence of vegetation retards* mechanical corrasion in that it weakens the force with which raindrops hit the earth, filters the water of such débris as may have been caught up and decreases its rate of flow by the obstacles the water has to overcome. But the capacity of chemical corrasion, which in its resultant form could more properly be termed chemical *shrinkage* than *degradation*, is less by 600 per cent. than that of mechanical corrasion. Therefore, as a check on the degradation of the earth's surface, vegetation, or forestry, with its litter of twigs, branches, and leaves, is a conservative influence.

The second direction of the value of these conclusions is that all our rivers, to a greater or less extent, are duplicating the work of the Mississippi. The chief end and aim of a river's life-work, it has been said, is to corrade its basin to base level. Why so few rivers complete their life-task is because the time required is so long that some climatic change or secular movement of the earth's crust intervenes, upsets all calculated plans, and the work has to be begun over again with a new base level. With the last phenomenon forestry does not deal, except that forests have been subjected themselves to such influences. The Glaciers were more drastic in their effect on our forests than rivers, perhaps. Species and whole *genera* were no doubt destroyed and the range of many of our present species limited to new areas. For example, persimmon, a species whose range is largely confined now to our Southern States, has been found embedded in Greenland; and there are other similar cases. But on our two groups of rivers, the Glacier River and the Topography River, forests have quite different effects. And the rivers in turn make quite different demands. The beautiful cascades and waterfalls so characteristic of the Glacier rivers are

souvenirs of the Glaciers themselves, the débris left by the powerful energy exerted when the Glaciers melted away. The soil also bears the imprint of its maker. Glaciated soil is only another name for a porous soil. Water falling on a porous soil naturally leaves the surface through percolation, and, as we have seen, has little capacity in going that way for damage. Again, in the glaciated region, mostly all north of the Ohio, where turf crops are largely cultivated, these turfs present an impediment to the rapid run-off of the waters.

Let us now take a river south of the Ohio by way of comparison. There we have the Topography River. The water-powers there are the result of uplifts in the earth's surface and the wearing away of alternate layers of soft and hard rocks. The soil over a large area, especially from Virginia to Mississippi, is residual clay. Now, clay is non-porous. When the rain falls upon it, the water prefers the way of the angle of slope to penetrating the clay. That causes an excessive and ruinous rate of surface run-off water. This condition is aggravated by the further fact that the crops grown are crops without turf—crops that require clean culture, cotton, tobacco and corn, principally. Now, if the rivers of this section are to be protected; if the silt, sediment, sand, gravel, and small stones are to be kept out of their channels, for it is the weight of these that, added to the force of the current, breaks down and lets the water through to carry death and destruction in its wake; if erosion is to be held down to a minimum, then forests must be replaced on the hills and mountain slopes, and the old fields must be covered with the litter of a new growth. All the more pressing is the need of this work when we consider that down from the Southern Appalachians flow the rivers that furnish the power for the great cotton and other manufacturing industries from Alabama to Virginia, from the Chattahoochee to the Potomac. For in this imminent age of electricity water-power is already recognized as our second greatest means of converting raw products into wealth.

Like all Gaul in ancient days, all rivers are divided into three parts, namely: The mountain tract, the valley tract, and the plains tract. Where the Missouri reaches the Rockies is the end of the mountain tract of the Mississippi, and thence southward to the Ohio would include the length of the valley tract. From the mouth of the Ohio the plains tract or flood plain of the Mississippi extends to the Gulf. It ranges in width from 5 to 80 miles and covers

an area of 50,000 square miles of the deepest, richest soil in this country. The two other sections, as we have seen, were subject to the direct action of the Glaciers. No forests are found on the Missouri from Nebraska to Western Wyoming and Montana, and on the main trunk of the Mississippi through Illinois, Iowa, and southern Minnesota forests are almost wanting. In the plains tract stand the finest hardwood forests of the continent. In fact the Lower Mississippi and its tributaries, with the Appalachians and Gulf and South Atlantic rivers, constitute the original hardwood area of the United States. So far as forestry is concerned, only the mountain and plains tracts need be taken into account. The high-lying coniferous forest of Idaho, Montana, and Wyoming, upon the head-waters of the Missouri, exert a direct influence on agriculture and life in the rich bottoms of the Lower Mississippi. It is the June freshets from the melting snow on the Rocky Mountains that keep the planter in the Lower Mississippi awake at night. All who have lived in northern latitudes know that the melting of the snow in coniferous woods is delayed at least six weeks in the spring. The snow in the open is gone six weeks ahead of the snow in the woods. Therefore if there were no forests on the upper reaches and sources of the Mississippi, what is now the June freshet would come six weeks earlier, in April. If the freshets came then very little damage to agriculture, whatever else followed, would be done, because there would be ample time after that to prepare the ground and plant the cotton crop. The river channel itself would undergo changes. The increased volume of water would increase the velocity of the current, and, if not too heavily loaded with matter in suspension, there would be increased corrasion, both lateral and vertical. This would tend to broaden and deepen the channel. Again, owing to the increased velocity, the matter in suspension would be taken farther out into the Gulf and delta formation would be spread over a wider area in a thinner layer. This seems to me a fairly logical conclusion as to what would happen in the Lower Mississippi if the mountain and other forests around its source were removed.

Now let us retrace our steps, and, following the trail of Lewis and Clark, go back to Wyoming and Montana. Something happened there, too, after the forests were removed. Beautiful little valleys, where once there stood the happy homes of the farmers, are now an over-layer of sand, gravel, and stones; the hillsides are bare and

gullied; the mountain slopes are denuded into jagged ridges. In a word, *erosion*, induced by the unarrested rain-water down the mountains, has accomplished the work of ruin and desolation.

This imaginary tragedy is not likely to be enacted, for all these forests already are within the boundaries of some of the Reserves, and since they come under the class of National Necessity Reserves, they should be kept. But there are operations going on in this area that have a bearing on the waters of the Lower Mississippi, and that is Irrigation. To what extent the sources of the Mississippi are to be tied up by the plans of the government for irrigation, I am not advised. Up to date the Chief Engineer, Mr. F. H. Newell, that most competent and efficient officer of the Reclamation Service, either has constructed or has plans for the construction of reservoirs on eight or ten of the tributaries of the Mississippi. These are known as the Shoshone, the Huntley, the Lower Yellowstone, the Belle Fourche, the North Platte, the Missouri River, the Milk River and the Red River projects. Some of these reservoirs, as, for example, that on the Shoshone River in northern Wyoming, which has a capacity of 350,000 acre-feet of water, will ultimately control the entire flow of water in the Shoshone River. Also, the reservoir planned for the North Platte is to have a capacity of 1,000,000 acre-feet, and in ordinary years will control the flow of water of the North Platte. Since every dam across a river is an attempt to organize the river against topography, when all these projects are completed the Lower Mississippi will be affected, as it seems to me, to this extent, and in these directions: In the first place, the danger of freshets will be lessened because there will be less water to come down, and it will come down—what is not absorbed by direct evaporation—distributed over a longer period of time. In the second place, the water starting from lower gradients and in smaller volume, will arrive in the main channel with a decreased velocity. Therefore the transporting power will be less effective, and hence deposits and sedimentation will begin sooner and farther up the river, with a tendency to choke up the channel.

One more aspect of the forests of the Lower Mississippi remains for review. If any, what are the effects of the forests here on these rich bottom lands in agricultural use? A forest for the present purpose may be defined as a community of trees to which each tree makes a yearly contribution for the benefit of its own and its neighbor's life

and growth. This communal reciprocity is not confined alone to the interior of the forest. Vegetation outside and in the vicinity is affected by forestal influences. A short consideration of the way in which tree growth develops will illustrate this point, for the physiology of plants is now well understood. A tree in the matter of growth is a tripartite firm. The two working members of the firm are the root system and the crown. The third member, the bole or stem, is the storehouse which receives and utilizes the annual earnings or product of the root and crown. Annually this storehouse enlarges to make new storage-room for the new products. Barring insect attacks and the entering of fungi, apparently this process might be repeated each season *semper et æternum*, and the tree thus realize that immortality for which the human race yearns. The two working members, however, reach out into wholly different territory and traffic in a wholly different line of goods; the root system is occupied exclusively in taking in water with salts in solution, which is conducted through a cellular-designed pipe-line up the bole and limbs and twigs to the leaves; here it delivers its burden to the carbon-dioxide that the leaves have extracted from the air, and some of the water, with the salts and the carbondioxide are broken up and compounded into carbohydrates, the plant food. As this is the process and these the elements used to make wood, it has been called "air solidified by sunshine." The disposition of the rest of the water is now the point of interest, for only a very small percentage of it was consumed in the manufacturing operation to create a food supply. The water is now in the leaf, unpacked of its load, and has to get out of the way. The back trail cannot be traveled. The water emerges through the stomata of the leaf into the air, that is, evaporation takes place. The amount of water thus utilized by every plant when manufacturing food is amazing, being no less than 300 to 400 times the dry weight of the plant. To be more specific, an oak tree of ordinary size, during the five months of its activity each year, will evaporate 560 barrels of water! What relation has this fact to agriculture in the Lower Mississippi? The staple article grown there is cotton—cotton that in length, silkiness and pliability of fibre is equaled nowhere else on the globe. After making full allowance for all the other contributory causes, yet this excelling quality comes, the writer believes, from the *atmospheric irrigation* of the hardwood forests. The fibre of the cotton grown on the Nile is just as long, if

not longer, yet it is coarse and harsh compared to the Mississippi bottom staple. It is grown on a soil just as rich, but without forests to give the *atmospheric irrigation*.

The far-famed Sea Island cotton, grown on the islands off the coast of South Carolina and Georgia, the most delicate and refined of all the cotton fibre, gets a direct atmospheric irrigation from the sea.

Nor is this influence of forests on agriculture limited to cotton. In vegetable gardens it is very evident. Of the vegetables grown in two near-by gardens, the one in the open and the other protected by a border of forest trees, those from the latter garden will be far more tender and palatable. Again, take the sweet-corn and apples grown in northern New York and New England. The quality-flavor in the sweet-corn and apples of that section is not approached elsewhere. Surely this is not all due to altitude and soil. Other features of the locality must have weight. That is a region where the foothills and mountain slopes of all the other States and a large part of Maine are forested, and the landscape is made picturesque with innumerable small lakes. Both direct and indirect evaporation are present, therefore, to furnish a uniform moisture to the atmosphere, which enables the plant to put on a regular, even growth, with no hard spots from stops and starts in growing. Therefore, it seems that without forests the best results, quality being the criterion, are not attainable in agriculture, for both *soil and atmospheric irrigation* in combined effort produce the finest crops.

GRAZING, WOODLAND, FOREST, DESERT AND IRRIGATED LAND, AND EXTENT OF WATER SUPPLY, IN WESTERN PUBLIC-LAND STATES, IN MILLIONS OF ACRES.

States and Territories.	Land Surface.	Grazing.	Woodland.	Forest.	Desert.	Improved.	Irrigated.	Water Supply.
Arizona	72	38	14	5	15	0.2	0.2	2
California	99	20	19	19	20	15	1.5	17
Colorado	66	40	9	5	------	2	1.2	8
Idaho	54	20	12	11	------	1	0.5	5
Montana	93	56	7	12	------	1	0.8	11
Nebraska	49	25	2	------	------	22	------	2
Nevada	70	42	6	1	20	1	0.5	2
New Mexico	78	57	12	4	------	0.5	0.2	4
North Dakota	45	38	1	------	------	6	------	2
Oregon	60	18	9	19	------	5	0.3	3
South Dakota	49	38	1	------	------	10	------	2
Utah	52	18	16	4	10	2	0.5	4
Washington	43	9	13	13	------	2	0.1	3
Wyoming	62	39	3	4	5	1	0.5	9

VACANT AND RESERVED AREAS IN THE WESTERN PUBLIC-LAND STATES.

State or Territory.	Total Area, Acres.	Vacant Acres.	Per Cent.	Reserved Acres.	Per Cent.
Arizona	72,332,800	47,082,321	65.1	20,344,487	28.1
California	101,350,400	33,156,877	32.7	21,874,865	21.6
Colorado	66,512,000	30,110,586	45.3	11,197,552	16.8
Idaho	53,272,000	33,485,389	62.9	7,801,355	14.4
Kansas	52,531,200	942,483	1.8	120,215	0.2
Montana	93,491,200	55,748,400	59.6	18,566,188	19.9
Nebraska	49,606,400	4,481,958	9.0	628,855	1.3
Nevada	70,848,000	61,226,774	86.4	5,983,409	8.4
New Mexico	78,451,200	52,095,312	66.4	7,571,223	9.6
North Dakota	45,308,800	7,050,306	15.6	3,438,709	7.6
Oklahoma	24,979,200	1,983,249	7.9	1,437,117	5.8
Oregon	61,459,200	20,180,261	32.8	14,495,400	23.6
South Dakota	49,696,000	9,932,113	20.1	12,236,301	24.6
Utah	54,380,800	38,847,341	71.4	8,360,121	15.4
Washington	44,275,200	8,566,563	19.3	11,392,757	25.7
Wyoming	62,649,600	37,623,329	60.0	14,017,618	22.4
Total	981,144,000	442,513,262	45.1	159,466,172	16.2

From F. H. Newell's *Irrigation*.

CONCLUSION.

So far as a pamphlet permitted, it has been shown that we need, first of all, to enlarge and broaden our Forest Administration. There should be a Board of Forest Conservators selected so as to give full representation in our forest management to all sections, and to all the varied interests of our country. We should then have a responsible body to look to for a rational and continuous forest policy. A timber crop can be grown and harvested but once in a century, and unless the starting and tending of that crop is properly begun and carried on, failure is sure to be the result. Where the opportunities are so few and far between we can only minimize the risk by applying to the problems the combined thought and experiences of the best body of men the country has in reserve for such work.

As to the field force in the Forest Service, there is need of a radical change in the methods of appointment. As far as practical, this force also should be representative of the people. Selections should be made from the different forest divisions of the country on some basis of a fair proportion, population being considered. The Forester should owe his selection to his individual merits, determined without favoritism or prejudice, and should not be made to feel that his position is in any way a perquisite of his superior officer. Another very strong reason for popularizing the Forest Service and taking the men proportionally from every State is this: Forestry for the next twenty-five years will be as much a *human* as a *technical* problem in this country. The Forester should have the experience which can cultivate man as well as a tree. The custom of appointment by Congressmen to West Point and Annapolis, with such limitations as seem necessary, might also be adopted for the Forest Service. Congress votes appropriations for the service and certainly Congress, and not one person, foreign to Congress, ought to say by whom and on whom that money should expended. Instead of writing and talking Congress down, somewhat the vogue of the day, it should be written up. Congress is every bit as good as the voters who elect it. No doubt there are unworthy men in Congress. So there are in every community. But, as a whole, Congress is patriotic and always contains men of great ability. Furthermore, Congress when left to its own calm judgment never makes a mistake. If we have

had bad legislation, it has been due either to Executive domineering, as in the reign of Andrew Jackson, or to the excessive zeal and excited passions of the people, as in Reconstruction Days. Nothing could be fairer and more satisfactory than the method by which the Congressman nominates his cadet. Why not, also, the Forester? That would do away with the sham and pretense of the Civil Service, which by its own rules makes the selection of a Forester *personalism*. And what is *personalism? Personalism* is the use of the power of position to nullify the intent of the law. It is the broad avenue for the admission of favorites and relatives, while the gates are closed and shut tight to keep out those who are lawfully entitled to enter. That this correctly describes the manner of getting into the Forest Service to-day, no one well informed will deny. A small coterie of the inner circle holds every appointment in its grip. If President Roosevelt would only use a *little stick* on these little fellows he would increase greatly his chance of getting from our forests a *big stick* when needed.

Up to date we have ninety-five Reserves west of the Mississippi River, and not one Reserve or park in the East. In the West we are taking every care to save mature trees, while in the East that very policy is destroying two young trees for every old tree preserved in the West. At express train speed the forests in the East are falling in response to the short supply of timber land for exploitation, the logical result of the Reserve policy in the West. When our Eastern timber is gone, as it will be within twenty-five years, we shall be wholly dependent upon the Pacific Slope and the Reserves if they are maintained. But the Reserves will afford no relief from the Pacific Slope monopoly. All timber sold from the Reserves will be bought by the Western timber men, the only ones who will be prepared to bid, these bidders being the same persons who own the Pacific Slope timber lands. If the price of lumber seems high, the man who builds a home in the East twenty-five years from to-day will figure on brick and stone for cheapness against wood. But since the Reserves exist by the caprice of the President, and any President may restore the reserve land to entry again, is it not unwise to be expending large sums of money on them? What ought to be done is this: Determine by a properly made up commission of civilians and experts which Reserves, or the parts of any Reserve,

are *national necessities* and make them Reserves or Parks by statute, to be kept permanently under forest management.

The White Mountain Park asked for in New England and the Southern Appalachian Park, are types of *National Necessity* Parks. The preservation of the forests there is demanded over and above local considerations. From these two areas issue the great manufacturing rivers of the East, whose power is an important factor in our national commercial supremacy. Undoubtedly there are such areas in the West, or they will become such, and they ought to be reserved. All land withheld from entry, that does not come under the head of *national necessity,* should be restored to the public domain and become again our common heritage. Grazing lands are not forest lands, and the live-stock business is not a necessary adjunct of forestry. All moneys available should be spent for direct and pressing forest requirements. Nor is the large expenditure for a literary bureau justifiable. If I understand the accounts correctly, last year something over $200,000 were used in literary efforts and publications of various kinds. This amount appropriated for five years would be enough to make at least one of the Reserve Parks the East is asking for a certainty. But if these Western Reserves are to be retained, and the rest of the public woodland, about 90,000,000 acres, is also to be reserved, there should be some compensating policy adopted for the East. The Irrigation Act, which seems to meet with general approval, offers a model. In accordance with the terms of the Irrigation Act, the money received for the public lands sold in the States specified is carried to a special account in the Treasury and held for irrigation purposes in the States in which the sold lands were. In a similar way let all moneys received from the sale of timber and wood from the Western Reserves be carried to a special account in the Treasury for reforestration in the East. The Eastern forests have been exhausted in building up the whole country, and it is but fair that the whole country should aid in replacing them. What we want above all things is a uniform development of forestry and a perpetuation of the necessary percentage of forests in every State and every section.

In the treatment of forestry and forest lands in the United States to-day no rule of general application can be laid down for every problem. Variations will have to be admitted to fit the particular situation. On the Pacific Slope and in the Rocky Mountain States the

problem is how to lumber and yet not destroy the young growth and leave the land stocked for a new crop.

In the Lake States the situation and solution are different. The virgin white-pine forests have been removed. Lumbering came, had its day and went away. It abandoned thousands of acres of cut-over lands to the States for taxes. In Minnesota, Michigan and Wisconsin the crying need is reforestration—reforestration, which is but another name for sylviculture.

The South Atlantic and Gulf States, so far as their coniferous forests are concerned, are begging to be rescued from the fate of the Lake States. No help seems to be going that way, and when forestry gets there it will be for reforestration.

The old fields and cut-over lands of New England and the other Northeastern States have long awaited reforestration. The Appalachian Mountains and the Atlantic and Gulf rivers, especially the Mississippi and its lower tributaries, the area once occupied by the broad-leaved or hardwood species, largely demands reforestration. The hardwoods still standing are in immediate need of forest management.

Now, how much of this work is our present forest administration doing? At the rate it is meeting this demand, it would require five hundred years to get the area just described under forest management. But with *Compulsory Reforestration* all of this work could and would be done with only a fraction of the cost to be borne by the United States Government. The States would act, individuals and corporations would act. There would be uniform and timely development of forestry throughout the United States. The beginning of such a movement could be started on the right road now by the assignment of a competent Forester, as already suggested, to each State administration, where the State was one that justified it by its possible forest area. This would only be following a military example, since any State that makes the request can get a West Pointer for the State troops.

After reviewing the figures and estimates that have been quoted of our lumber supply, and after making such additions and changes as the circumstances seem to dictate, the stock of timber twelve inches and over in the United States and Territories, exclusive of Alaska, might be classed and located as follows:

Northeastern States	25,000,000,000	ft. b. m. conifers.
Lake States	70,000,000,000	ft. b. m. conifers.
Rocky Mountain States	80,000,000,000	ft. b. m. conifers.
Southern and Southwestern States	250,000,000,000	ft. b. m. conifers.
Pacific Slope States	800,000,000,000	ft. b. m. conifers.
All the States	250,000,000,000	ft. b. m. hardwoods.
Total stock	1,475,000,000,000	ft. b. m. conifers and hardwoods.

Now, if the consumption in 1900 aggregated 45,000,000,000 feet b. m., there would seem to be a supply for the rise of thirty years.

The tenure of the land upon which the timber stands is held by the

United States,
States,
Corporations,
Speculators,
Farmers.

The United States, according to estimates, owns about 36 per cent.; farmers, 30 per cent.; States, corporations, and speculators, 34 per cent. The acreage of all these holdings is supposed to run up to 700,000,000. On the basis of these calculations our present forest administration is taking charge of only the government's percentage of the total—about 200,000,000—with small voluntary parcels coming under management. Practically, therefore, there are about 500,000,000 acres of woodland in the United States without forestry care. Hence, the grand problem for forestry in the United States is to get these 500,000,000 acres in charge, and to put it all in a condition of productivity. If this could be done, and the average increment or annual growth of an acre of well-stocked woodland is 90 feet b. m., it is seen at once that the acreage would put on a growth annually equal to the consumption of the census year (1900), or 45,000,000,000 feet b. m. But this result is possible only through *Compulsory Reforestration.*

For many of the facts and figures in this pamphlet I am indebted to the various books of Dr. B. E. Fernow and of Dr. C. A. Schenck, especially to the latter's *Forest Policy.* Prof. I. C. Russell's *Rivers of North America* has also been made use of freely, as well as the bulletins of the Forest Service. The War Department and the Department of the Interior have always responded promptly to requests for information.

LEADING LUMBER TREES IN THE UNITED STATES.

HARDWOODS.

White Oak	*Quercus alba.*
Red Oak	*Quercus rubra.*
Chestnut Oak	*Quercus prinus.*
Black Oak	*Quercus velutina.*
Tanbark Oak	*Quercus densiflora.*
Hickory	*Hicoria alba.*
Shagbark	*Hicoria ovata.*
Ash	*Fraxinus Americana.*
Beech	*Fagus atropunicea.*
Chestnut	*Castanea dentata.*
Yellow Poplar	*Liriodendron tulipifera.*
Yellow Birch	*Betula lutea.*
Paper Birch	*Betula papyrifera.*
Basswood	*Tilia Americana.*
Cotton-wood	*Populus deltoides.*
Swamp Cotton-wood	*Populus heterophylla.*
Elm	*Ulmus Americana.*
Walnut	*Juglans nigra.*
Cherry	*Prunus serotina.*
Maple	*Acer saccharum.*
Sycamore	*Platanus occidentalis.*
Tupelo Gum	*Nyssa aquatica.*
Coffee Tree	*Gymnocladus dioicus.*

CONIFERS.

Long-leaf Pine	*Pinus Palustris.*
Short-leaf Pine	*Pinus echinata.*
Bull Pine	*Pinus ponderosa.*
Jack Pine	*Pinus divaricata.*
Red Pine	*Pinus resinosa.*
White Pine	*Pinus strobus.*
Sugar Pine	*Pinus lambertiona.*
Red Spruce	*Picea Rubens.*
White Spruce	*Picea canadensis.*
Engelmon Spruce	*Picea engelmanni.*
Sitka Spruce	*Picea sitchensis.*
Hemlock	*Tsuga canadensis.*
Western Hemlock	*Tsuga heterophylla.*
Tomarock	*Larix laricina.*
Western Larch	*Larix occidentalis.*
Red Fir	*Pseudo tsuga taxifolio.*
Balsam Fir	*Abies balsamea.*
Lowland Fir	*Abies grandis.*
White Fir	*Abies concolor.*
Amabalis Fir	*Abies amabalis.*
Noble Fir	*Abies nobilis.*
Incense Cedar	*Libocedrus decurrens.*
Red Cedar	*Thuja plicata.*
White Cedar	*Chamæcyparis thyoides.*
Yellow Cedar	*Chamæcyparis nootkatensis.*
Red Juniper	*Juniperus unginiana.*
Bald Cypress	*Taxodium distichum.*
Redwood	*Sequoia sempervirens.*

PERCENTAGE OF FOREST AREA BY STATES.

From Dr. C. A. Schernd's "Forest Policy, 1890."

OVER 70 PER CENT.	OVER 60 PER CENT.	OVER 50 PER CENT.	OVER 40 PER CENT.
Maine	Michigan	New Hampshire	Vermont
West Virginia	Minnesota	Massachusetts	New Jersey
North Carolina	South Carolina	Pennsylvania	Maryland
Georgia	Mississippi	Virginia	Idaho
Alabama	Louisiana	Kentucky	
Arkansas	Tennessee	Wisconsin	
Washington	Indian Territory	Oregon	
	Florida	Missouri	

OVER 30 PER CENT.	OVER 20 PER CENT.	OVER 10 PER CENT.	UNDER 10 PER CENT.
New York	District of Columbia	Illinois	North Dakota
Delaware	Ohio	Iowa	South Dakota
Connecticut	Texas	Oklahoma	Nebraska
Colorado	Montana	Wyoming	Kansas
Rhode Island	Arizona	New Mexico	Nevada
	California	Utah	
	Indiana		

APR 16 1906

Western North Carolina

or the

Appalachian Mountain Region

Occupies 6,000 square miles, varying in elevation from 2,000 to 6,700 feet. On this area stands in merchantable timber, of twelve inch in diameter and over, about

10,500,000,000 ft. b.m.

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